

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventive Application of : Bjornerud et al.
Application No. : 10/018,026
Filing Date : June 11, 2002
Art Unit : 3736
Title : Method of Magnetic Resonance Imaging
Docket No. : NIDN-10403

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APPEAL BRIEF

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I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Amersham Health AS (now a part of GE Healthcare, a part of General Electric “GE”).

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences related to the instant appeal.

III. STATUS OF CLAIMS

Claims 24-33 are pending in this application. The Examiner has rejected all of these claims. Claims 24-33 as amended during prosecution are reproduced in the **Claims Appendix** attached hereto. Appellants are appealing the rejections of Claims 24-33.

IV. STATUS OF AMENDMENTS

No claims were amended subsequent to the Examiner’s final rejection that was mailed on May 23, 2005.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 24 describes a method of magnetic resonance imaging of a kidney in vascularized human or non human body which comprises administering into the vasculature of said body a bolus of a blood pool magnetic resonance contrast agent, generating a contrast enhanced magnetic resonance image of said kidney during the first pass of said contrast agent, and generating at least one further magnetic resonance image of said kidney after the concentration of said contrast agent throughout the blood of said

body has become substantially uniform and, deriving from said MR images values indicative of one of renal perfusion and renal artery stenosis grade.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The issues for review in this appeal arise from a Final Rejection that was mailed on May 23, 2005.

The Examiner rejected claims 24, 30-33 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,381,486 (“Mistretta”) in view of an article by Stark entitled “Magnetic Resonance Imaging” (“Stark”). This rejection is respectfully traversed.

The Examiner also rejected claims 25-27 under 35 U.S.C. § 103 (a) as being unpatentable over Mistretta in view of Stark and further in view of U.S. Patent No. 5,128,121 (“Berg”). This rejection is respectfully traversed.

In addition, the Examiner rejected claim 28 under 35 U.S.C. § 103 (a) as being unpatentable over Mistretta in view of Stark and further in view of U.S. Patent No. 6,411,837 (“Fischer”). This rejection is respectfully traversed.

Finally, the Examiner rejected claim 29 under 35 U.S.C. § 103 (a) as being unpatentable over Mistretta in view of Stark and further in view of U.S. Publication No. 2004/0208827 (“McMurry”). This rejection is respectfully traversed.

Therefore, the issues in this appeal are:

1. Whether Mistretta in view of Stark disclose or suggest the elements of claims 24 and 30-33?
2. Whether Mistretta in view of Stark contain a motivation to combine one reference with the other reference?
3. Whether Mistretta in view of Stark and further in view of Berg, individually or in combination, disclose or suggest the elements of claims 25-27?
4. Whether Mistretta in view of Stark and further in view of Berg, contains a motivation to combine one reference with the other reference?
5. Whether Mistretta in view of Stark and further in view of Fischer, individually or in combination, disclose or suggest the elements of claim 28?
6. Whether Mistretta in view of Stark and further in view of Fischer, contain a motivation to combine one reference with the other reference?
7. Whether Mistretta in view of Stark and further in view of McMurry, individually or in combination, disclose or suggest the elements of claim 29?
8. Whether Mistretta in view of Stark and further in view of McMurry, contain a motivation to combine one reference with the other reference?

VII. ARGUMENT

The Examiner rejected claims 24, 30-33 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,381,486 (“Mistretta”) in view of an article by Stark entitled “Magnetic Resonance Imaging” (“Stark”). This rejection is respectfully traversed.

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Finally, the Examiner rejected claim 29 under 35 U.S.C. § 103 (a) as being unpatentable over Mistretta in view of Stark and further in view of U.S. Publication No. 2004/0208827 (“McMurry”). This rejection is respectfully traversed.

Appellants respectfully request that The Board of Patent Appeals and Interferences (“Board”) should reverse the Examiner’s rejections for the reasons set forth below.

A. The Examiner’s Rejections of Claims 24 and 30-33 Should be Reversed Since Mistretta in view of Stark Fails to Disclose, Teach or Suggest All the Elements of the Claims

The present invention claims a method where a bolus of contrast agent is administered to, for instance, a patient and images of the patient’s kidney are generated during the first pass of the bolus. Imaging following the first pass allows for perfusion information and quantification (e.g. in units of ml blood/min) as a dynamic process. The first pass of the contrast agent bolus, i.e. the transient effect of the contrast agent, is monitored. The present invention

thus initially provides a type of strong but transient signal enhancement. As time passes by, the signal enhancement drops while the contrast agent distributes more uniformly in the blood.

There is still signal enhancement from the contrast agent, just not as prominent as it was after the first pass bolus. This more-uniform distribution of the contrast agent – or the steady-state phase – is the second time point where images are generated. These images provide morphological information. As described on page 9 of the application, both sets of images may be superimposed as to permit a doctor to view directly a correlation between a stenosis and a hyperperfused or non-perfused area in the kidney.

Mistretta discloses an improved contrast enhanced (CE)-magnetic resonance angiogram (MRA) method which employs the NMR data acquired during the first pass of a bolus of contrast agent through the region of interest to identify arteries, veins, and unenhanced background tissue, and to use that time resolved information to segment NMR image data subsequently acquired during the steady state portion of the examination. The method uses a time resolved series of images acquired during the first pass of the contrast bolus to calculate arterial and venous contrast enhancement reference curves. These curves are used to determine which voxels in an image contain arteries and which contain veins and those voxels which are unenhancing, background tissue or noise. The arterial/venous determination may then be used to suppress venous and background signal in a high resolution arterial image.

Furthermore, in the final Office Action dated May 23, 2005, the Examiner indicates that “Mistretta discloses that it is known to image the kidney in examining the vasculature”. However, this statement can not be construed to mean that Mistretta was referring

to the field of magnetic resonance angiography. Mistretta states that diagnostic studies of the human vasculature by X-ray imaging methods show circulation of blood in the arteries and veins of the kidneys. Mistretta does not disclose, teach, or suggest imaging the kidneys vasculature by magnetic resonance imaging.

Stark discloses using magnetic resonance angiography to determine the number of renal arteries in patients as well as the presence of renal artery stenosis.

The Examiner's rejection is premised on the following:

Given the disclosure of Mistretta of using the method of producing a magnetic resonance angiogram in a patient, it would have been obvious to one skilled in the art to modify Mistretta such that the method is applied to the secondary reference, Stark, in imaging a kidney in a vascularized human or nonhuman body by deriving from the images values indicative of one of renal perfusion and renal artery stenosis grade.

Appellants will address this characterization below, but first note that the Court of Appeals for the Federal Circuit has outlined the requirements for establishing a prima facie case of obviousness.

First, [i]t is impermissible within the framework of 35 U.S.C. §103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443 (Fed. Cir. 1986). (emphasis added). Something in the prior art as a whole must suggest the

desirability, and thus the obviousness, of making the combination. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1051 (Fed. Cir. 1988). (emphasis added). It is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor. *Northern Telecom Inc. v. Datapoint Corp.*, 908 F.2d 931, 934 (Fed. Cir. 1990). (emphasis added).

Appellants respectfully submit that in the final Office Action dated May 23, 2005, the Examiner has applied Mistretta not on the basis of Mistretta as a whole, but by picking out a feature of Mistretta – magnetic resonance imaging of a kidney’s vasculature - on which Mistretta does not even disclose let alone suggest. Mistretta is concerned with the physical structure of the blood vessels and does not suggest or teach towards acquiring renal perfusion information of the kidney. Furthermore, the method of Mistretta provides only an image of the vasculature while in the present invention the degree of contrast is used as a measure of how much blood is present in the kidney. Accordingly, the method of Mistretta identifies arteries, veins, and unenhanced background tissue and not the grade of perfusion and stenosis of the kidney. Hence combining the method of Mistretta with the teaching of Stark could and would not lead one skilled in the art to the present invention.

With respect to the secondary reference, Appellants note that the law has long established that “[a] basic mandate inherent in 35 U.S.C. §103 is that “a piecemeal reconstruction of prior art patents in light of the appellants’ disclosure” shall not be the basis for a holding of obviousness.” *In re Kamm and Young*, 452 F.2d 1052. (C.C.P.A. 1972).

Appellants respectfully submit that the Examiner's reasoning regarding these references evidences an improper piecemeal reconstruction of the present invention.

In the Office Action, the Examiner asserts that:

It would have been obvious to one skilled in the art to use the method of examining vasculature disclosed by Mistretta on the kidney to provide a diagnosis of such an organ as taught by Stark.

Appellants question the factual basis for this statement. First, as discussed previously, Mistretta does not disclose, teach, or suggest imaging the kidneys vasculature by magnetic resonance imaging. Second, Mistretta does not even disclose, teach, or suggest acquiring renal perfusion information from the magnetic resonance images nor does Mistretta disclose, teach, or suggest a contrast enhanced magnetic resonance image to measure how much blood is present in the kidney. Third, Stark does not even teach, disclose, let alone suggest the steps of a method of acquiring a magnetic resonance imaging of a kidney in a vascularized human or non human body as disclosed in the present invention.

Appellants respectfully submit that by making such a leap from what the prior art actually states to what the Examiner characterizes the references as stating is an indication of the Examiner's improper use of the Appellants own disclosure as a blueprint for reconstructing the present invention in piecemeal fashion.

Thus, Appellants respectfully submit that by mischaracterizing the teachings of Mistretta, and by failing to properly demonstrate a motivation for combining these particular features of each reference, the Examiner has failed to establish a prima facie case of obviousness against the present invention.

Furthermore, by teaching positively towards certain embodiments or features as being important or preferred, the art provides a motivation for the person skilled in the art to go in a particular direction. If that direction leads towards subject matter outside the scope of the claims at issue, then it constitutes a “teaching away”. Appellants maintain that the person skilled in the art, even if assumed to be contemplating improvement of Mistretta, would focus on the teachings in Mistretta of embodiments taught to be important, and be motivated to improve those elements. In Mistretta these are clearly the improvement of imaging the physical structure of the blood vessels i.e. blood vessel anatomy/vasculature, which is described at length throughout the specification. Again, Mistretta itself does not even discuss acquiring renal perfusion information from the magnetic resonance images nor does it discuss a contrast enhanced magnetic resonance image to measure how much blood is present in the kidney, and hence gives no weight to these features.

In accordance with the aforementioned, Appellants respectfully request that the Board reverse the Examiner’s rejections and direct that claims 24 and 30-33 be allowed.

B. The Examiner's Rejection of Claims 25-27 Should be Reversed Since Mistretta in view of Stark, and further in view of Berg, Individually or In Combination, Fail to Disclose, Teach or Suggest All the Elements of the Claims

The Examiner suggests that it would be obvious to combine the teaching of Mistretta in view of Stark and further in view of U.S. Patent No. 5,128,121 ("Berg").

Berg discloses a method of generating enhanced images of the human or non-human animal body, which involves administering to the body a positive magnetic resonance imaging contrast agent which is body-tissue or body duct-specific.

Since claims 25-27 are dependent upon claim 24, claims 25-27 only introduce further limitations to the present invention. In other words, dependent claims 25-27 will stand or fall based on independent claim 24.

As stated previously, Mistretta itself does not disclose, teach, or suggest imaging the kidneys vasculature by magnetic resonance imaging. Furthermore, Mistretta does not even disclose, teach, or suggest acquiring renal perfusion information from the magnetic resonance images nor does Mistretta disclose, teach, or suggest a contrast enhanced magnetic resonance image to measure how much blood is present in the kidney, and hence gives no weight to these features.

It is important to note again that [i]t is impermissible within the framework of 35 U.S.C. §103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such

reference fairly suggests to one skilled in the art. *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443 (Fed. Cir. 1986). (emphasis added). Furthermore, it is insufficient that the prior art disclosed the components of the patented device, either separately or used in other combinations; there must be some teaching, suggestion, or incentive to make the combination made by the inventor. *Northern Telecom Inc. v. Datapoint Corp.*, 908 F.2d 931, 934 (Fed. Cir. 1990). (emphasis added).

With respect to the secondary references, Stark and Berg, Appellants note that the law has long established that “[a] basic mandate inherent in 35 U.S.C. §103 is that “a piecemeal reconstruction of prior art patents in light of the appellants’ disclosure” shall not be the basis for a holding of obviousness.” *In re Kamm and Young*, 452 F.2d 1052. (C.C.P.A. 1972). Appellants respectfully submit that the Examiner’s reasoning regarding these references evidences an improper piecemeal reconstruction of the present invention.

Additionally, there is nothing in Mistretta and Stark to motivate the teachings of Berg, which is concerned with a blood pool contrast agent.

In accordance with the aforementioned, Appellants respectfully request that the Board reverse the Examiner’s rejections and direct that claims 25-27 be allowed.

C. The Examiner's Rejection of Claim 28 Should be Reversed Since Mistretta in view of Stark and further in view of Fischer Individually or In Combination, Fail to Disclose All the Elements of the Claims

The Examiner suggests that it would be obvious to combine the teaching of Mistretta in view of Stark and further in view of U.S. Patent No. 6,411,837 ("Fischer").

Fischer discloses a method for the chronologically high-resolution magnetic resonance tomography of the female breast.

Since claim 28 is dependent upon claim 24, claim 28 only introduces a further limitation to the present invention. In other words, dependent claim 28 will stand or fall based on independent claim 24.

As has been argued at length above, Mistretta does not disclose, teach, or suggest imaging the kidneys vasculature by magnetic resonance imaging. Furthermore, Mistretta does not even disclose, teach, or suggest acquiring renal perfusion information from the magnetic resonance images nor does Mistretta disclose, teach, or suggest a contrast enhanced magnetic resonance image to measure how much blood is present in the kidney.

Furthermore, Stark does not even teach, disclose, let alone suggest the steps of a method of acquiring a magnetic resonance imaging of a kidney in a vascularized human or non human body as disclosed in the present invention.

Additionally, there is nothing in Mistretta and Stark to motivate the teachings of Fischer which is concerned with the female breast.

The combination [Mistretta] + [Stark] + [Fischer] therefore leads to a wide range of possibilities. The combination therefore does not lead to the specific subject matter of the present claims. Consequently, the present claims are believed non-obvious over the combination.

In accordance with the aforementioned, Appellants respectfully request that the Board reverse the Examiner's rejection and direct that claim 28 be allowed.

D. The Examiner's Rejection of Claim 29 Should be Reversed Since Mistretta in view of Stark and further in view of McMurry Individually or In Combination, Fail to Disclose All the Elements of the Claims

The Examiner suggests that it would be obvious to combine the teaching of Mistretta in view of Stark and further in view of U.S. Publication No. 2004/0208827 ("McMurry").

McMurry relates to contrast agents for diagnostic imaging with prolonged blood retention.

Since claim 29 is dependent upon claim 24, claim 29 only introduces a further limitation to the present invention. In other words, dependent claim 29 will stand or fall based on independent claim 24.

Again, as has been argued at length above, Mistretta does not disclose, teach, or suggest imaging the kidneys vasculature by magnetic resonance imaging. Furthermore, Mistretta does not even disclose, teach, or suggest acquiring renal perfusion information from the magnetic resonance images nor does Mistretta disclose, teach, or suggest a contrast enhanced magnetic resonance image to measure how much blood is present in the kidney. Furthermore, Stark does not even teach, disclose, let alone suggest the precise steps of a method of acquiring a magnetic resonance imaging of a kidney in a vascularized human or non human body as disclosed in the present invention.

Additionally, the magnetic resonance image is a T1-weighted image, which is a further limitation of the present invention that is not even disclosed, taught, or suggested by Mistretta or Stark. Furthermore, there is no motivation to combine Mistretta and Stark with the teachings of McMurry that is related to contrast agents for diagnostic imaging with prolonged blood retention.

Again, Appellants note that the law has long established that “[a] basic mandate inherent in 35 U.S.C. §103 is that “a piecemeal reconstruction of prior art patents in light of the appellants’ disclosure” shall not be the basis for a holding of obviousness.” *In re Kamm and Young*, 452 F.2d 1052. (C.C.P.A. 1972). Appellants respectfully submit that the Examiner’s

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Attorney Docket No. NIDN-10403

reasoning regarding these references evidences an improper piecemeal reconstruction of the present invention.

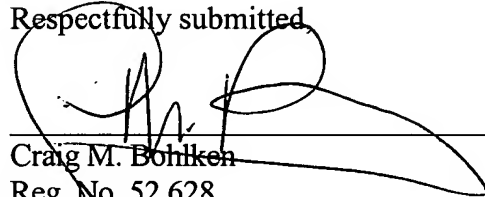
In accordance with the aforementioned, Appellants respectfully request that the Board reverse the Examiner's rejection and direct that claim 29 be allowed.

CONCLUSION

In view of the foregoing, Appellants respectfully request that the Board reverse the rejections of Claims 24-33 as set forth in the Office Action mailed May 23, 2005, that the Board allow the pending claims since they are in condition for allowance, and that the Board grant any other relief as it deems proper.

Dated: November 28, 2005

Respectfully submitted,



Craig M. Bohlken
Reg. No. 52,628
Amersham Health, Inc.
101 Carnegie Center
Princeton, NJ 08540-6231
(609) 514-6530

XIII. CLAIMS APPENDIX

24. A method of magnetic resonance imaging of a kidney in vascularized human or non human body comprising the steps of:
- administering into the vasculature of said body a bolus of a blood pool MR contrast agent;
 - generating a contrast enhanced MR image of said kidney during the first pass of said contrast agent;
 - generating at least one further MR image of said kidney after the concentration of said contrast agent throughout the blood of said body has become substantially uniform and, deriving from said MR images values indicative of one of renal perfusion and renal artery stenosis grade.
25. The method of claim 24, wherein said blood pool MR contrast agent is a superparamagnetic contrast agent.
26. The method of claim 24, wherein said blood pool MR contrast agent comprises magnetic iron oxide particles having on their surfaces an optionally modified polysaccharide and optionally a material which inhibits opsonization.
27. The method of claim 24, wherein said blood pool MR contrast agent comprises superparamagnetic iron oxide particles having on their surfaces degraded starch.
28. The method of claim 24, wherein said contrast enhanced MR image of said kidney generated during the first pass of said contrast agent is a T_2^* -weighted image.
29. The method of claim 24, wherein said at least one further MR image of said kidney generated after the concentration of said contrast agent throughout the blood of said body has become substantially uniform is a T_1 -weighted image.

30. The method of claim 24, wherein values indicative of renal perfusion are derived from said MR images.
31. The method of claim 24, wherein values indicative of renal artery stenosis grade are derived from said MR images.
32. The method of claim 24, wherein said contrast enhanced MR image of said kidney generated during the first pass of said contrast agent is used to quantify intra-parenchymal blood volume.
33. The method of claim 32, wherein said method is used to assess parenchymal damage.

IX. EVIDENCE APPENDIX

Appellants hereby append copies of the following patents:

U.S. Patent 6,381,486 by Mistretta et al.;

“Magnetic Resonance Imaging”, Stark et al., 1992, Mosby-Year Book, Volume One, pp. 327-328.

U.S. Patent 5,128,121 by Berg et al.;

U.S. Patent 6,411,837 by Fischer; and

U.S. Patent Publication No. 2004/0208827 by McMurry et al.

This is the evidence relied upon by the Examiner for rejection of appealed Claims 24-33 in the Office Action dated May 23, 2005.

X. RELATED PROCEEDINGS APPENDIX

There are no other appeals or interferences related to the instant appeal.

Volume One

MAGNETIC RESONANCE IMAGING

DAVID D. STARK, M.D.

Professor of Radiology
Director of MRI
University of Massachusetts Medical Center
Worcester, Massachusetts

WILLIAM G. BRADLEY, Jr., M.D., Ph.D., F.A.C.R.

Director, Magnetic Resonance Imaging
and Radiology Research
Long Beach Memorial Medical Center
Long Beach, California
Professor in Residence, Radiology
University of California—Irvine
Orange, California

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*We dedicate this edition to the future of our profession
and to our children: Elizabeth, David, Kristin, India, and Felicity.*

SECOND EDITION

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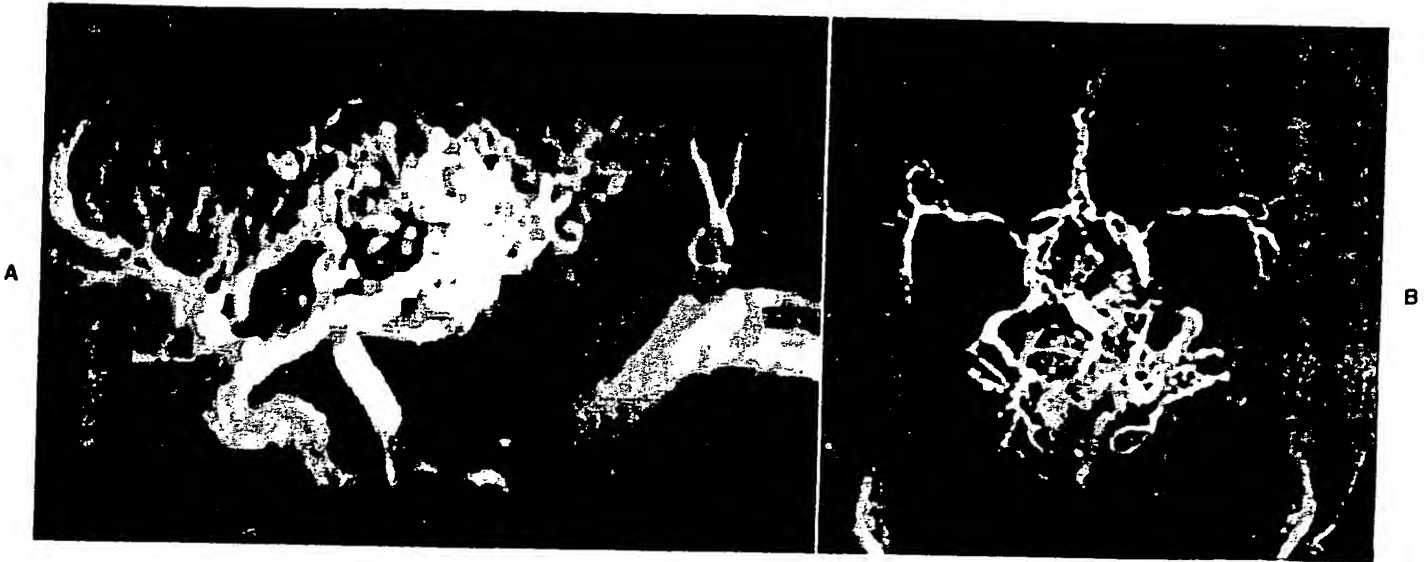


Figure 12-31. Vein of Galen malformation. **A**, Lateral and **B**, axial MIP reconstructions of 3DFT TOF MR angiogram. (Courtesy G Bongartz).

a case of enhancing tumor, high signal from the mass may present a "vascular pseudomass" on the postprocessed angiogram. Thus while potentially useful, MR angiography is currently less informative relative to conventional contrast angiography for the evaluation of intracranial neoplastic disease.

Abdomen and chest

The bulk of clinical experience thus far has been directed toward MR angiography of the head and neck, but application of these techniques in other regions is also encouraging. Imaging of the abdomen and chest is difficult due to extensive cardiac, respiratory, and peristaltic motion. Despite these constraints, the sequential 2DFT technique performed with breath-holding during short intervals of image acquisition is described as a robust and reproducible method for MR angiography within these regions.^{34,44,46,61,65}

Arterial stenosis/occlusion. The potentially treatable nature of renal artery stenosis has made its detection a major focus in the evaluation of arterial hypertension.¹⁰⁸ In the ongoing search for a noninvasive modality to diagnose this vascular disorder, the application of sequential 2DFT methods to the evaluation of the renal vessels has been the subject of several recent reports. A preliminary study described a technique to visualize the renal arteries free of venous overlap that employs a crossed pattern of selective presaturation volumes overlying the inferior vena cava and lower poles of the kidneys during the sequential acquisition of slightly overlapped 5 mm thick 2DFT slices (Figure 12-32). Using selective presaturation of aortic blood at the level of the diaphragm, renal venograms without arterial overlap can be obtained as well. With this technique, coronal and axial orientations appear to have sufficient flow-

related enhancement to produce images of diagnostic quality.^{34,61}

The clinical evaluation of renal artery stenosis was investigated using a variation of this technique in 25 patients, with a total examination time of less than 30 minutes. No spatial presaturation was used, with overlapping venous structures avoided in part through performing "targeted" MIP reconstruction on a limited number of slices.



Figure 12-32. Bilateral paired renal arteries (*arrows*) seen in an abdominal angiogram produced with sequential 2DFT coronal 5 mm slices. Presaturation pulses were placed over the lower kidneys and inferior vena cava to prevent venous overlap.

The results of MR angiography were compared to conventional intraarterial angiographic studies. MR angiography correctly determined the number of renal arteries in all patients, detecting five accessory arteries, and displayed a sensitivity of 100% and a specificity of 92% in the detection of luminal narrowing of 50% or greater. The degree of stenosis was overestimated in 4 out of 55 renal arteries, no case of stenosis was underestimated, and all four cases of renal artery occlusion were correctly identified. Although this technique was reliable in the proximal main renal artery, spatial resolution was insufficient for the adequate evaluation of the distal segment and intrarenal vessels, representing a potential limitation for the detection of the predominantly distal lesions of fibromuscular dysplasia.⁶¹

The sequential 2D TOF MR angiographic method has also been applied in the evaluation of the inferior vena cava and aorta.^{34,61,65} As described previously, placement of a selective axial presaturation slab over the lower thoracic aorta allows the rapid visualization of the abdominal venous system without overlapping arteries. Preliminary results suggest that the images obtained are of diagnostic quality (see Figure 12-22, C).³⁴ Evaluation of the inferior vena cava with venous occlusion has also been described with the phase-contrast method; however, the presence of overlapping arteries proved problematic.¹⁴⁶

In the study of renal artery stenosis described, atherosclerotic narrowing of the aorta was also evaluated, correctly grading the degree of stenosis in 88% of cases and correctly depicting two associated abdominal aortic aneurysms.⁶¹ Other investigators used a similar gradient-echo technique to evaluate the aorta in 29 patients with documented peripheral vascular disease, with relevant clinical findings similar to conventional contrast aortography in approximately 66% of patients. Disagreements between the two modalities were based primarily on differences in the measured severity of stenosis.⁶⁵ Preliminary implementation of phase-contrast techniques in evaluation of aortic disease has been described, as well, in 13 patients with atherosclerosis and aortitis. Although the problem of venous overlap noted on static phase-contrast examinations could be reduced through the application of a cardiac-gated dynamic method, overestimation of the extent of aortic stenosis continues to be observed.¹⁴⁵

Venous disease. Another subject of interest within the abdomen is the evaluation of the portal venous system. In combination with TOF flow quantification, the sequential 2DFT method was applied to depict both normal and pathologic portal anatomy.^{34,44} The method used is similar to that described for imaging the inferior vena cava and renal veins, with sequential 5 to 6 mm thick slices acquired in the axial, coronal, and, occasionally, sagittal orientation during a breath-hold and placement of a spatial presaturation slab over the lower thoracic aorta to eliminate arterial overlap. In practice, two or three slices are acquired dur-



Figure 12-33. Portal hypertension in a patient with hepatic cirrhosis. Abdominal angiogram produced with sequential 2DFT coronal 5 mm slices. Saturation pulses are used to eliminate incoming aortic flow. Portal vein obstruction is suggested by the absence of obvious flow in the portal vein as well as the prominent splenic collaterals (arrow). HA, Hepatic artery; HV, hepatic vein. (Courtesy J Finn.)

ing each breath-hold to expedite the examination. In one study, accurate imaging of the main portal vein and its intrahepatic branches was achieved in all six normal volunteers and showed abnormal collateral flow with portal vein occlusion and esophageal, gastric, and splenic varices in the four patients studied (Figure 12-33).³⁴ The authors subsequently compared portal MR angiography to ultrasound and discovered additional clinically pertinent findings on MR angiography in 6 of 11 patients, including two cases of unsuspected spontaneous splenorenal shunts, one case of undetected reversal of portal flow, and three cases of additional collateral vessels. All findings were substantiated with CT, contrast angiography, or surgery.³⁹

Pulmonary arteries. Examination of the pulmonary arteries is another challenging application for MR angiography for the problems of respiratory and cardiac motion are considerable. Preliminary studies, again with the sequential 2DFT TOF method, show promise for the visualization

AF/3736



TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No. **NIDN-10403**

Re Application Of: **Bjornerud, et.al.**

IFW

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/018,026	June 11, 2002	Ruth S. Smith	36335	3736	4684

Invention: **Method of Magnetic Resonance Imaging**

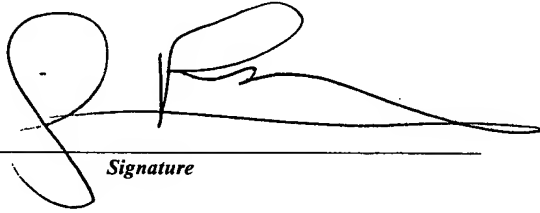
COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on

The fee for filing this Appeal Brief is: **\$500.00**

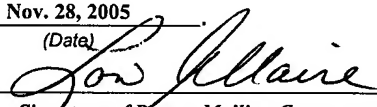
- ☐ A check in the amount of the fee is enclosed.
- ☒ The Director has already been authorized to charge fees in this application to a Deposit Account.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **502-665**
- ☐ Payment by credit card. Form PTO-2038 is attached.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.


Signature

Dated: **November 28, 2005**

Craig Bohlken
Reg. No. 52,628
Amersham Health, Inc.
IP Department
101 Carnegie Center
Princeton, NJ 08540
(609) 514-6530

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on	
Nov. 28, 2005	(Date)
	
Signature of Person Mailing Correspondence	
Lori Allaire	
Typed or Printed Name of Person Mailing Correspondence	

cc: